HATCHERY EVALUATION REPORT

Umatilla Hatchery - URB Fall Chinook

September 1996

Integrated Hatchery Operations Team (IHOT)

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Umatilla Hatchery - URB Fall Chinook

An Independent Audit Based on Integrated Hatchery Operations Team (IHOT) Performance Measures

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Section 1

Executive Summary

This report presents the findings of the independent audit of the Umatilla Hatchery - URB Fall Chinook program. The hatchery is located on the Columbia River near Irrigon in northeastern Oregon. The hatchery is used for egg incubation and rearing of summer steelhead, spring chinook, fall chinook, and winter steelhead.

The audit was conducted in 1996-1997 as part of a 2-year effort that will include 67 hatcheries and satellite facilities located on the Columbia and Snake River system in Idaho, Oregon, and Washington. The hatchery operating agencies include the U.S Fish and Wildlife Service, Idaho Department of Fish and Game, Oregon Department of Fish and Wildlife, and Washington Department of Fish and Wildlife.

Background

The audit is being conducted as a requirement of the Northwest Power Planning Council (NPPC) "Strategy for Salmon" and the Columbia River Basin Fish and Wildlife Program. Under the audit, the hatcheries are evaluated against policies and related performance measures developed by the Integrated Hatchery Operations Team (IHOT). IHOT is a multi-agency group established by the NPPC to direct the development of new basinwide standards for managing and operating fish hatcheries. The Bonneville Power Administration (BPA) contracted with Montgomery Watson to act as an independent contractor for the audit.

IHOT has established five basic policies that cover: (1) hatchery coordination, (2) hatchery performance standards, (3) fish health, (4) ecological interaction, and (5) genetics. The audit focuses on all these policies, with the exception of hatchery coordination. These policies are set forth in *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries (IHOT 1995).* That document is the source for the performance measures that are the basis of this audit.

The Audit Process

The audit was based on the facility management's response to a 109-page questionnaire. This audit form was completed through a five-step process in which:

- Information was obtained from headquarters.
- The hatchery manager was asked to fill out and return the audit form.
- A 1-2 day site audit inspection visit was conducted to inspect facilities, review hatchery records, discuss audit form responses, and develop remedial action plans.
- A compliance report was developed to document the compliance status of each performance measure. This report was then shared with the hatchery manager and IHOT representative.
- This hatchery evaluation report was written to document compliance with IHOT performance measures and develop cost estimates for remedial actions when needed.

Umatilla Hatchery - URB Fall Chinook Results

The hatchery began operation in 1991 to provide salmon and steelhead for release into the Umatilla River. The Umatilla Hatchery facility includes 10 concrete Oregon ponds, 24 concrete Michigan ponds, 8 Canadian troughs, and incubation facilities. One aspect of the Umatilla Hatchery's operation is an evaluation of the results of rearing in Oregon vs. Michigan ponds. The entire hatchery water supply is groundwater.

The hatchery was in general compliance with most of the performance measures. In the area of program objectives, it was not possible to evaluate compliance for smolt to adult survival because returns of fish reared at the hatchery have only recently begun, and survival data is not yet available. In the area of facilities requirements, the audit found that the hatchery was not in compliance with the recommended water temperature criteria for incubation and rearing and did not meet the monitoring requirements for chemistry, nitrite, and contaminants. The audit also found that the facility was not in compliance with monitoring requirements for the frequency of checking alarms and the criteria for verification of feed ingredients by a regional quality control officer. The hatchery has insulated feed hoppers but they are not adequate to maintain the contents at or below 80°F on very hot days. In the area of hatchery practices, the audit found that the hatchery had no written standards for incubation, written loading and flow criteria, or specific smoltification criteria. The hatchery also did not meet two IHOT criteria for disinfection of transport vehicles. In the area of genetics policy, the hatchery did not have written spawning protocols or a Genetics Monitoring and Evaluation Program in place.

The specific areas in which the Umatilla Hatchery - URB Fall Chinook program requires remedial actions based on the IHOT performance measures are listed below. These remedial actions are listed in alphabetical order without intent of ranking or otherwise assigning priority:

- Begin routine testing of alarms using IHOT recommendations
- Conduct IHOT feed QA/QC testing
- Develop a genetics monitoring and evaluation program in IHOT Operations Plan
- Develop smoltification goal and monitoring plan
- Develop specific incubation standards and written incubation practices for the IHOT Operations Plan
- Develop written flow and loading criteria for incubation in IHOT Operations Plan
- Develop written spawning protocols in IHOT Operations Plan
- Document adult contribution
- Document adult pre-spawning survival over time
- Follow IHOT disinfection policies for transportation
- Monitor chemistry, nitrite, and contaminants on routine basis
- Provide a second set of screens for all raceways (24 Michigan ponds and 12 Oregon ponds)

Non-compliance issues resulting from items beyond human control or Performance Measures not relevant to this hatchery (Type 1 in Table 3, Section 4) were not listed above.

Section 2

Facility Description

Name: Umatilla Hatchery

Stock/Species: URB Fall Chinook

Operating Agency: Oregon Department of Fish and Wildlife

Funding Agency: Bonneville Power Administration

Location: Near Irrigon, OR on the Columbia River

Address:
Umatilla Hatchery
Oregon Department of Fish and Wildlife
Route 2, Box 151
Irrigon, OR 97844

Hatchery Manager: Mr. Jack Hurst

Phone: (541) 922-5659

Fax: (541) 922-5664

Purpose: The Umatilla Hatchery was authorized under the Northwest Power Planning Council's (NPPC) Fish and Wildlife Program and began operation in 1991. Hatchery funding is provided by Bonneville Power Administration. The hatchery is used for egg incubation and rearing of spring chinook, fall chinook, and summer steelhead for release into the Umatilla River.

Production Goal: Production goal for the Umatilla Hatchery has been reduced from original plan because of water shortage; planned for 15,000 gpm but only can produce 8,000 to 10,000. These are the FY96 production goals for the Umatilla Hatchery:

Summer Steelhead
150,000 smolts (30,000 lbs) for acclimation and release at Bonifer and Minthorn facilities on the Umatilla River

Spring Chinook
390,000 smolts (48,750 lbs) for acclimation and release at Thornhollow and Imeques C-mem-ini-kem facilities on the Umatilla River

URB Fall Chinook

2,682,000 subyearlings (44,700 lbs) for acclimation and release at Thornhollow and Imeques C-mem-ini-kem facilities on the Umatilla River

Water Supply:

Pumped supply from 4 remote wells producing a total of 5,100 gpm

Facilities:

Adult Holding:	N/A
Incubation:	192 16-tray vertical incubators
	30 stacks of 3, 4-tray vertical incubators
Early Rearing:	8 Canadian troughs - 576 cf
Raceways:	10 Oregon ponds - 5,972 cf each
	24 Michigan ponds - 2,252 cf each
Rearing Ponds:	None
Satellite Facilities:	Acclimation and release of all stocks: Bonifer, Minthorn, Thornhollow, and Imeques C-mem-ini-kem ponds
	Fall chinook broodstock holding and spawning: Three Mile Falls Dam facility

Section 3

Compliance Status

The hatchery audits are based on compliance with written IHOT performance measures. These performance measures are documented in ***Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries*** (referred to as *IHOT 1995* in this report).[1] The purpose of the performance measures is to implement new basinwide policies that provide regional guidelines for operating anadromous hatcheries in the Columbia Basin.

The audit focuses on performance measures for IHOT policies that cover (1) hatchery performance standards, (2) fish health, (3) ecological interaction, and (4) genetics. These performance measures are intended to guide hatchery operations once production is established. For that reason, the hatchery operations audit included broodstock collection, spawning, incubation of eggs, fish rearing and feeding, fish release, equipment maintenance and operations, and personnel training. Production priorities are beyond the scope of this audit.

Based on *IHOT 1995*, a detailed 109-page audit form was developed. The audit form divided the performance measures into six major sections along major program and technical criteria areas. Two additional sections (sections 1 and 8) include general information and expenditure information needed for the Hatchery Evaluation Report and blank forms for additional comments:

Section 1	Performance Measures for General Information and Expenditure Information (PMs General 1-2)
Section 2	Performance Measures for Program Objectives (PMs 1-4)
Section 3	Performance Measures for Facility Requirements (PMs 5-15)
Section 4	Performance Measures for Hatchery Practices (PMs 16-25)
Section 5	Performance Measures for Fish Health Policy (PMs 26-34)
Section 6	Performance Measures for Ecological Interactions (PMs 35-38)
Section 7	Performance Measures for Genetics Policy (PMs 39-43)
Section 8	Blank Forms for Additional Comments

Several performance measures are repeated in various sections of the audit form. These performance measures overlap in *IHOT 1995* and were retained to allow individuals interested in specific portions of the audit (such as Genetics or Fish Health) to determine the compliance status of all performance measures for a given topic in one location. A repeated performance measure is indicated by shaded text.

The Hatchery Audit Process

The hatchery audit will be conducted over a 2-year period that concludes in 1997. At each hatchery, a five-step process was used to complete the overall hatchery audit. This process consisted of research and on-site visits. The site visit was conducted on September 17 - 18, 1996.

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[1]Integrated Hatchery Operations Team (IHOT) 1995. *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries*, Bonneville Power Administration, Portland, Oregon.

The following is the five-step audit process:

1. Information was obtained from headquarters.

2. The hatchery manager was asked to fill out and return the **Audit Form**.

3. A 1-2 day site audit inspection visit was conducted at each hatchery. During that visit an audit team inspected facilities, reviewed hatchery records, discussed audit form responses, and developed remedial action plans when appropriate.

4. During the site visit, the compliance status of each performance measure was discussed with the hatchery manager and IHOT representative. A portion of the Hatchery Evaluation Report was sent to the hatchery manager following the audit visit as a **Compliance Report**. That compliance Report is Table 2 of this document.

5. This information from steps 1 - 4 was used to prepare a draft **Hatchery Evaluation Report**. This draft report was submitted to the operating agencies for review of the information used to determine compliance. Based on review and comments, a final Hatchery Evaluation Report was developed. The final report documents the compliance of a particular hatchery with the IHOT performance measures and presents cost estimates to correct any deficiencies.

Compliance Status of Umatilla Hatchery - URB Fall Chinook

The following table includes information on life-stages that are held on this facility for some portion of their rearing cycle (Table 1). For multi-facility programs, summary cost and contribution data is presented at the facility where rearing occurs. For the compliance status relating to performance measures that do not occur at this hatchery, please refer to the Hatchery Evaluation Reports for the hatcheries and stocks listed in Table 1. A check mark (✔) indicates that the specific life stage is held at this facility.

This section documents the compliance status of the Umatilla Hatchery - URB Fall Chinook. Each performance measure is presented in a table taken from the audit form (Table 2). The compliance status is identified by the following categories:

- **N/A** (not applicable)
- **Yes** (in compliance)
- **?** (unknown; generally due to unavailability of information to determine compliance)
- **No** (not in compliance).

Remedial actions are suggested for performance measures not in compliance. These remedial actions are grouped into categories and listed in Section 4 of this report, where the cost of the required remedial actions is also presented.

Table 1 Summary Program Information for Umatilla Hatchery - URB Fall Chinook

Component	Location of Adult Holding, Spawning, Incubation, and Rearing					
	Three Mile Falls Dam [1]	Umatilla Hatchery	Imeques C-mem-ini-kem	Thornhollow		
Adult Collection	✔					
Adult Holding	✔					
Spawning	✔					
Fertilization	✔					
Incubation		✔				
green-to-eyed		✔				
eyed-to-hatch		✔				
Rearing						
fry		✔				
fingerlings		✔				
smolts		✔				
Acclimation/release			✔	✔		

[1] Adult collection, holding, spawning, and fertilization also occurs at Bonneville, Little White Salmon, and Priest Rapids Hatcheries. Use of broodstock from these facilities will decrease over time as fall chinook returns to the Umatilla River increase.

Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
	N/A	Yes	?	No		
the hatchery programs outlined in a subbasin nagement plan?		✔			Columbia Basin System Planning Production Plan and Umatilla Hatchery and Basin Annual Operation Plan (AOP)	
ne hatchery operating under a current hatchery rational plan?		✔			IHOT Operations Plan and Umatilla Hatchery and Basin AOP	
s it understood by staff?		✔				
s it being followed?		✔				
hatchery monitoring and evaluation plan in place?						
Do you have a written monitoring and evaluation plan?		✔			Umatilla Hatchery and Basin AOP	
ult contribution to fisheries, spawning grounds, and chery			✔		Data for 1991 and 1992 brood years unavailable	Document adult contribution
ult pre-spawning survival as compared with blished goal			✔		No data provided for review; holding facility not in operation long enough to provide the information	Document adult pre-spawning survival over time
g-take as compared with established hatchery goal		✔			Review of records/Discussion	
gen-egg to eyed-egg survival as compared with blished goal				✔	Remote egg-take and transport shock has led to low survival. In compliance 1 year out of 3	Increase egg-take from Three Mile facility as run size increases over time or ship gametes rather than fertilized eggs
d-egg to fry survival as compared with established l		✔			Review of records/Discussion	
to smolt survival as compared with established goal			✔		Subyearling program in compliance Yearling program not in compliance/ incomplete data for 1995 brood year	Improve fry-to-smolt survival, need to evaluate data in subsequent years
duction as compared with established goal		✔			Production at goal set in current AOP	
cent survival (smolt to adult) as compared with blished goal			✔		Data not yet available for determination of compliance	Develop the data as hatchery operations continue and information on brood years becomes available
nber of eggs, fry, fingerlings, smolts, and/or adults neet basinwide needs	✔				Review of records/Discussion	

Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
	N/A	Yes	?	No		
nperature						
Does your water temperature meet the criteria for spawning?	✔				No adults held on station	
Does your water temperature meet the criteria for ncubation?				✔	Use chillers to retard development and meet program requirements	None. Temperature modification required to meet program goals.
Does your water temperature meet the criteria for earing?				✔	Exceed high end of temperature range by 1-5°F in summer	None. Does not affect production timing or size at release.
solved gases						
s the oxygen level near saturation?		✔			Review of 4 years' data	
s the dissolved nitrogen level less than saturation?		✔			Review of 4 years' data	
emistry						
mmonia (un-ionized)			✔		No data for supply water	Run analysis
Carbon Dioxide			✔		No data for supply water	Run analysis
Chlorine			✔		No data for supply water	Run analysis
H			✔		No data for supply water	Run analysis
Copper			✔		No data for supply water	Run analysis
Hydrogen Sulfide			✔		No data for supply water	Run analysis
ron			✔		No data for supply water	Run analysis
inc			✔		No data for supply water	Run analysis
bidity						
Does your turbidity meet the criteria?		✔			Groundwater supply with no visible turbidity	
alinity and hardness						
Does your alkalinity and hardness meet the criteria?		✔			Review of 4 years' data	
rite						
Does your nitrite meet the criteria?			✔		No data	Run analysis

Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
	N/A	Yes	?	No		
ıtaminants						
ıldrin			✔		No data for supply water	Run analysis
ındrin			✔		No data for supply water	Run analysis
)ieldrin			✔		No data for supply water	Run analysis
Ieptachlor			✔		No data for supply water	Run analysis
:hlordane			✔		No data for supply water	Run analysis
Methoxychlor			✔		No data for supply water	Run analysis
ıindane			✔		No data for supply water	Run analysis
Malathion			✔		No data for supply water	Run analysis
;uthion			✔		No data for supply water	Run analysis
hogens						
Vhat portions of the hatchery have disease-free water?						
Adult holding	✔				No adults held on station	
Incubation		✔			Groundwater	
Early rearing		✔			Groundwater	
Rearing		✔			Groundwater	
Others		✔			Groundwater at truck fill station	

Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
	N/A	Yes	?	No		
rm Systems						
)o the following areas have alarms?						
Intake		✔				
Large rearing ponds and adult holding ponds	✔				No adults held on station	
Raceway headboxes and rearing ponds		✔			Inspection of facilities/Discussion	
Incubation facilities		✔			Inspection of facilities/Discussion	
Quarantine areas and facilities	✔				No quarantine areas or facilities	
Water treatment systems		✔				
Security		✔				
ıre there outside systems and buzzers in on-site esidences?		✔			Discussion	
ıre water flow alarms checked daily?				✔	Discussion	Develop daily checking routine
ıre all other alarms checked weekly?				✔	Discussion	Develop weekly checking routine
s there a log of alarms for emergencies, tests, and ıaintenance requirements?				✔	Discussion	Develop alarm log
ıre telephone pagers used?				✔	Discussion/Residences are hard-wired to alarms	None. Not a problem
ılt collection and holding facilities						
)o you meet the adult holding criteria?	✔				No adults held on station	

Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
	N/A	Yes	?	No		
ıbation facilities						
'ype 1: _16-tray vertical stacks_)o you have an adequate number of units for the verall program?		✔			Inspection of facilities/Discussion	
'ype 2: _3,4-tray stacks)o you have an adequate number of units for the verall program?		✔			Inspection of facilities/Discussion	
ıring facilities						
'ype 1:_Oregon Ponds_)o you have an adequate number of units for the verall program?		✔			Inspection of facilities/Discussion	
'ype 2:_Michigan Ponds)o you have an adequate number of units for the verall program?		✔			Inspection of facilities/Discussion	
'ype 3:_Canadian Troughs_)o you have an adequate number of units for the verall program?		✔			Inspection of facilities/Discussion	

Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
	N/A	Yes	?	No		
eening facilities						
)o you meet the approach velocity criteria?	✔				Groundwater supply - no screens needed	
ıre the fish screens regularly cleaned?	✔				Groundwater supply - no screens needed	
)oes the screen mesh meet screen opening criteria?	✔				Groundwater supply - no screens needed	
ıre rearing containers double screened for fish that hould not be released to adjacent water?				✔	Have slots for second screen but do not use them	Provide second set of screens
dator control facilities						
ıre your predation control facilities effective?		✔			Inspection of facilities/Discussion	

Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
	N/A	Yes	?	No		
d storage facilities and quality control						
)oes the storage of dry/semi-moist/moist foods dry<12%; semi-moist 12-20%; moist >20% moisture) ollow food manufacturer's recommendations?		✔			Inspection of facilities/Discussion	
)oes a regional quality control officer oversee roduction procedures and monitor:						
Verification by feed manufacturer that ingredients meet specifications?				✔	Discussion with hatchery manager and regional quality control officer	Verify ingredients meet specifications
Ensure feed does not contain unwanted drugs or other additives?				✔	Discussion with hatchery manager and regional quality control officer	Inspect for unwanted drugs and additives
Analyze ingredients contained in the final food product to ensure that feed specifications have been met?				✔	Discussion with hatchery manager and regional quality control officer	Analyze ingredients against feed specifications
ıre the foods stored and handled according to the ollowing criteria?						
Moist pellets should not exceed 10 °F at point of delivery.		✔			Discussion	
Moist pellets should be removed from freezer just prior to feeding.		✔			Discussion	
Do not leave buckets of feed or feed containers outside exposed to light or heat.		✔			Discussion	
Open bags of feed should be fed within one to two days except when feeding small groups of fish.		✔			Discussion	
Automatic feeder hoppers and bulk storage facilities should be insulated against excessive temperatures (80°F and above).				✔	Discussion/Feed hoppers are insulated but reach or exceed ambient in hot (>90°F) weather	Unknown. Have not noticed a problem when this occurs.

Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
	N/A	Yes	?	No		
ease facilities						
)o the release facilities ensure that fish are not ubjected to adverse conditions?		✔			Inspection of facilities/Discussion	
lution abatement facilities						
)o the pollution abatement facilities meet all federal nd state regulations (or good engineering practice)?		✔			Inspection of facilities/Discussion	
ıre pollution abatement facilities operated correctly?		✔			Discussion	
nsportation facilities						
ıre the transport systems adequate to meet IHOT erformance measures for transportation practices?		✔			Inspection of facilities/Discussion	

Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
	N/A	Yes	?	No		
odstock selection practices						
s the donor selection process document attached?	✔				Existing program; does not apply	
Was the donor selection outline followed in selecting ne hatchery broodstock?	✔				Existing program; does not apply	
to PM #40 in Genetics Section						
wning practices						
Were the appropriate number of spawners, male/female atios, and fertilization protocols used?	✔				See PM #42	
to PM #42 in Genetics Section						
ıbation practices						
specific incubation standards listed in the hatchery rations plan?				✔	Reviewed IHOT Operations Plan (OP)	Develop standards for the OP
incubation practices written?				✔	None supplied to inspection team	Develop standards for the OP
ıbation Type 1: Vertical (see PM #8) you meet the loading and flow criteria?			✔		Review of records/Discussion. Not a problem in meeting program requirements.	Develop written loading and flow criteria
ıbation Type 2: Vertical (see PM #8) you meet the loading and flow criteria?			✔		Review of records/Discussion. Not a problem in meeting program requirements.	Develop written loading and flow criteria

Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
	N/A	Yes	?	No		
ring practices						
specific rearing standards listed in the hatchery rations plan?		✔			Review Hatchery AOP for 1996	
rearing practices written?		✔			Review of rearing standards in Hatchery AOP	
earing Unit Type 1: Oregon (see PM #9)						
Do you meet the density and DI criteria?	✔				Discussion	Criteria under evaluation as part of M&E program
Do you meet the Loading and FI criteria?	✔				Discussion	Criteria under evaluation as part of M&E program
earing Unit Type 2: Michigan (see PM 9)						
Do you meet the density and DI criteria?	✔				Discussion	Criteria under evaluation as part of M&E program
Do you meet the Loading and FI criteria?	✔				Discussion	Criteria under evaluation as part of M&E program
earing Unit Type 3: Canadian (see PM 9)						
Do you meet the density and DI criteria?	✔				Discussion	Criteria under evaluation as part of M&E program
Do you meet the Loading and FI criteria?	✔				Discussion	Criteria under evaluation as part of M&E program
olt quality						
Do you produce a high quality smolt?		✔			Discussion	

Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
	N/A	Yes	?	No		
h health management practices						
re the monthly hatchery monitoring visits being onducted? (PM #26)		✔			Review of records/Discussion	
re the annual broodstock inspections being conducted? PM #27)	✔				Broodstock held elsewhere	
there pathogen-free water and are the sanitation rocedures being followed? (PM #28)		✔			Review of records/Discussion	
re the following water quality parameters within riteria? (PM #5a-5h)						
Water temperature				✔	Review of records/Discussion	Not a problem
Dissolved gases		✔			Review of records/Discussion	
Chemistry			✔		No data	Run analysis
Turbidity		✔			Review of records/Discussion	
Alkalinity and hardness		✔			Review of records/Discussion	
Nitrite			✔		No data	Run analysis
Contaminants			✔		No data	Run analysis
re rearing standards being followed? (PM #19)	✔				Review of records/Discussion	
re egg and fish transfer/release requirements met? PM #31)		✔			Review of records/Discussion	

Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
	N/A	Yes	?	No		
s hatchery performance meet requirements lined in the regional hatchery policies and in basin and hatchery plans for the following areas?						
cent smoltification						
Do you measure percent smoltification?		✔			General visual exam; % descaling, visual parr marks	
Did you meet the smoltification criteria?				✔	No goal found; being evaluated by M&E program	Develop smoltification criteria
ring density (prior to release)						
Did you meet the rearing density criteria just prior to elease?	✔				Review of records/Discussion	
ease condition (at release)						
Did you meet all disease regulations just prior to elease?		✔			Review of records/Discussion	
nber (at release)						
Did you meet the release number goal?				✔	Not in compliance for subyearlings, in compliance for yearlings	Develop Umatilla River stock as sole brood source
: at release						
Did you meet the size goal?		✔			Review of records/Discussion	
es of release						
Did you meet the release date goal?		✔			Review of records/Discussion	
ation of release						
Did you release the fish at the specified location?		✔			Review of records/Discussion	
fish reared in the subbasin or acclimated in the basin?						
are the fish reared in the subbasin?				✔	Rearing occurs at the hatchery ; no or limited capability for subbasin rearing.	None
are the fish acclimated in the subbasin?		✔			Discussion	
ne release strategy appropriate for the program?		✔			Discussion	

Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
	N/A	Yes	?	No		
nsportation facilities						
)o transportation equipment and personnel receive isinfection before and after use?		✔			Discussion	
; the fish tank interior disinfected using a solution of 00 ppm active chlorine for 30 minutes minimum or ormaldehyde gas generation method (relative humidity f 60% for 2 hrs)?		✔			Discussion	
Is the exterior of the fish transport vehicle disinfected using high pressure steam (115-130°C), high temperature acid, or with 200 ppm chlorine for 30 minutes?				✔	Discussion	ODF&W disinfection policies differ from IHOT. Resolve differences
; the fish transport vehicle (cab) disinfected using 600 pm quaternary ammonia compounds (1.5 ml of 50% tock solution/liter water)?				✔	Discussion	ODF&W disinfection policies differ from IHOT. Resolve differences
; other equipment disinfected including fish pumps, ets, egg sorters, waders, boots, rain gear, hoses and ther equipment using one of the following solutions?		✔			Discussion	
200 ppm chlorine for 30 minutes 600 ppm quaternary ammonia compound for 30 minutes						
200 ppm iodophor solution for 10 minutes		✔			Discussion	

Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
	N/A	Yes	?	No		
)o personnel wear protective garments when handling sh eggs or cultural water?		✔			Discussion	
)o the fish transport truck/chassis and tank/unit receive n inspection and service prior to the release season?		✔			Discussion	
; a daily service inspection completed before starting p and leaving for the day?		✔			Discussion	
)oes the fish transport unit receive an inspection prior) loading?		✔			Discussion	
)oes a pre-loading inspection covering the following: ank water level, pumps or aerators, oxygen injection ystem settings, displacement gauge, and truck)ading/hauling density tables checked and reviewed ccur prior to loading the fish in the transport unit?		✔			Discussion	
)o hauling criteria include checking the fish 45 minutes) 1 hour after loading occur?		✔			Discussion	
Vhen fish are active and systems are functioning roperly, is the oxygen concentration reduced and aintained at approximately 8 ppm?		✔			Discussion	
; water temperature in the transportation unit aintained within the 42-48 °F range?		✔			Discussion	
)o fish releasing procedures include the following riteria?		✔			Discussion	
Releasing the fish at the correct release site or into the correct water body.		✔			Discussion	
Tempering or the difference between the liberation tank and the target water body should not exceed 10°F.		✔			Discussion	
The liberation hose should be angled so that fish gently hit the water. Using a tripod is a method of ensuring the hose will stay at the proper angle.		✔			Discussion	

Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
	N/A	Yes	?	No		
luation practices						
las the hatchery conducted fishery contribution studies):						
Determine the requirements for evaluating and improving management programs?		✔			Discussion/Done as part of M&E program	
Develop guidelines that define the geographical area and identify component stocks (hatchery and/or wild) that comprise the management unit?		✔			Discussion	
Develop guidelines that define if the proper stocks of fish are currently being used?		✔			Discussion	
Determine which management units contribute to a specific fishery and the time periods of those contributions?		✔			Discussion	
Determine the relative contributions of the various management units to a specific fishery over the different time periods?		✔			Discussion	

Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
	N/A	Yes	?	No		
ining practices						
Does the hatchery have a training schedule for its staff?		✔			Review of records/Discussion	
Does each staff member have a personal training plan approved by a supervisor and reviewed annually?		✔			Review of records/Discussion	
Does the hatchery routinely exchange training details between other hatcheries and agencies?		✔			Review of records/Discussion	
Does the hatchery encourage and reward off-duty training of staff?		✔			Review of records/Discussion	
Does the hatchery conduct monthly staff meetings?		✔			Review of records/Discussion	

Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
	N/A	Yes	?	No		
monthly hatchery monitoring visits being ducted by a qualified fish health specialist as cribed below?						
Conduct visit at least monthly		✔			Review of records/Discussion	
Monitoring conducted by qualified fish health specialist		✔			Review of records/Discussion	
Examine a representative sample of healthy and moribund fish from each lot.		✔			Review of records/Discussion	
Review fish culture practices with hatchery manager.		✔			Review of records/Discussion	
Report finding and results of necropsies on standard form.		✔			Review of records/Discussion	
Recommend appropriate drug or chemical treatment.		✔			Review of records/Discussion	
Summarize fish health status or stock prior to release or transfer to another facility.		✔			Review of records/Discussion	
all of the functions of the hatchery yearly nitoring visits being completed as described below?						
Annually examine each broodstock for the presence of reportable viral pathogens.	✔				Not at this station	
Annually screen each salmon broodstock for the resence of *Renibacterium salmoninarum*.	✔				See above	
Conduct inspection by or under the supervision of ualified fish health specialist.	✔				See above	

Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
	N/A	Yes	?	No		
ıe hatchery following accepted sanitation cedures?						
ıre there any sources of pathogen-free water, especially or incubation and early rearing?		✔			Discussion	
ıre the hatchery sanitation procedures understood and eing followed as described below?						
Disinfect/water harden eggs in iodophor?		✔			Inspection of facilities/Discussion	
Are foot baths containing disinfectant placed at the incubation facility's entrance and exit?		✔			Inspection of facilities/Discussion	
Is equipment and rain gear utilized in broodstock handling or spawning sanitized prior to its use elsewhere in the hatchery?		✔			Inspection of facilities/Discussion	
Is equipment used to collect dead fish sanitized prior its use in another pond and/or lot of fish?		✔			Inspection of facilities/Discussion	
Is equipment, including vehicles used to transfer fish between facilities, disinfected prior to use with any other fish lots or at any other location?		✔			Inspection of facilities/Discussion	
Are rearing vessels sanitized after fish are removed and prior to introducing a new fish lot or stock?		✔			Inspection of facilities/Discussion	
Are dead fish properly disposed of?		✔			Inspection of facilities/Discussion	

Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
	N/A	Yes	?	No		
water quality parameters being followed?						
re the following water quality parameters within riteria? (PM #5a-5h)						
Water temperature				✔	Review of records/Discussion	Not a problem. See PM #5a.
Dissolved gases		✔			Review of records/Discussion	
Chemistry			✔		No data	Run analysis
Turbidity		✔			Review of records/Discussion	
Alkalinity and hardness		✔			Review of records/Discussion	
Nitrite			✔		No data	Run analysis
Contaminants			✔		No data	Run analysis
o to PM #21						
incubation and rearing standards being followed?						
Are the incubation practices following the IHOT incubation criteria? (PM #18)			✔		Review of records/Discussion	
Are the rearing practices following the IHOT criteria? (PM #19)	✔				Review of records/Discussion	
o to rearing practices PM #18-PM #19						
egg and fish transfer/release requirements met?		✔			Discussion	

Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
	N/A	Yes	?	No		
ne hatchery's program outlined in a subbasin nagement plan? Go to subbasin plan PM # 1		✔			Columbia Basin System Planning Production Plan and Umatilla Basin Master Plan	
ne hatchery operating under a current hatchery rational plan? Go to operational plan PM # 2		✔			Review IHOT Operations Plan and Umatilla Hatchery and Basin Annual Operations Plan (AOP)	Run analysis
hatchery monitoring and evaluation plan in place? Go to hatchery monitoring and evaluation plan PM # 3		✔			M&E program described in AOP	Not a problem

Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
	N/A	Yes	?	No		
s the hatchery program meet requirements blished in the regional hatchery policies and basin planning documents in the following areas: cies, stock, broodstock collection location, odstock numbers, broodstock collection strategy, spawning and egg-take protocols?						
Does the hatchery program meet the requirements for he following?						
Species protocols (PM #4a)		✔			Review of records/Discussion	
Stock protocols (PM #4a)		✔			Review of records/Discussion	
Broodstock collection location protocols (PM #41)	✔				No broodstock collection at hatchery	
Broodstock numbers protocols (PM #42)	✔				No broodstock at hatchery	
Broodstock collection strategy protocols (PM #41)	✔				No broodstock at hatchery	
Spawning protocols (PM #42)	✔				No spawning at hatchery	
Egg-take protocols (PM #42)	✔				No egg-take at hatchery	

Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
	N/A	Yes	?	No		
s the hatchery's performance meet requirements						
ined in the regional hatchery policies and in basin and hatchery plans for the following areas: cent smoltification, rearing density, disease						
dition, and the number, size date(s), and location of ase?						
ercent smoltification (PM #22a1)			✔		Measure smoltification; but no goal found	
earing density (PM #22a2)		✔			Review of records/Discussion	
)isease condition (PM #22a3)		✔			Review of records/Discussion	
Number at release (PM #22a4)				✔	Review of records/Discussion	Develop Umatilla stock as sole brood source
ize at release (PM #22a5)		✔			Review of records/Discussion	
)ate of release (PM #22a6)		✔			Review of records/Discussion	
ocation of release (PM #22a7)		✔			Review of records/Discussion	
fish reared in the subbasin or acclimated in the basin? ee PM #22b		✔			Fish are not reared in the subbasin; they are acclimated in the subbasin	
ne release strategy appropriate for the program? ee PM #22c		✔			Discussion	

Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
	N/A	Yes	?	No		
new programs, has a broodstock collection plan n developed?						
s the broodstock collection plan written?	✔				Not a new program	
or a non-captive broodstock program:	✔				See above	
Was an unbiased, representative sample collected?						
Was the recommended number of broodstock collected?						
or a captive broodstock program:	✔					
Were captive brood progeny excluded as donors for propagating the next generation of the captive broodstock program?					See above	
Were full-sib crosses avoided?						
s the broodstock collection plan understood and being ollowed by staff?	✔				See above	
a new program, was the donor selection outline owed in selecting the hatchery broodstock?						
s a donor selection plan written?	✔				Not a new program	
Was the donor selection outline followed in selecting ne broodstock?	✔				See above	
Was the target stock recommended in the donor election process actually used?	✔				See above	

Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
	N/A	Yes	?	No		
existing programs, were the broodstock collection cedures followed?						
s the broodstock collection plan written?	✔					
Does the broodstock collection plan follow the uideline:						
Was an unbiased, representative sample collected?	✔					
Was the recommended number of broodstock collected?	✔				Discussion	
Were the broodstock collection procedures in hatchery operation plan understood and followed?	✔				Discussion	
Were the broodstock collection procedures in hatchery operation plan understood and followed?	✔				Discussion	

Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
	N/A	Yes	?	No		
s the appropriate number of spawners, male/female os, and fertilization protocols used?						
ıre the spawning protocols written?				✔	No written protocols	Develop written protocols
ıre daily or weekly spawning logs available?	✔				At other stations for the period audited	
Vas the appropriate number of spawners used?	✔				See above	
)id you attempt to spawn all collected broodstock and ındomize mating with respect to age class, and other ·aits?	✔				See above	
Vas the sex-ratio within the limits given in the erformance standards?	✔				See above	
Vere the fertilization protocols followed?	✔				See above	
: the hatchery needed to reduce the number of eggs etained, was this done by representative sampling of ach male/female cross?	✔				See above	

Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
	N/A	Yes	?	No		
ıere a genetics monitoring and evaluation program lace?						
; a genetics monitoring and evaluation program vailable?				✔	Discussion	Develop a genetics M&E program
)oes the plan address the following elements listed in HOT:						
Does the program have elements needed to meet evaluation goals 1-4?			✔		No program is in place	Develop a genetics M&E program
Has a qualified geneticist reviewed and endorsed the program (goal 5)?			✔		No program is in place	Develop a genetics M&E program
Will the program collect the data and maintain the records needed to evaluate compliance on an ongoing basis (goal 5)?			✔		No program is in place	Develop a genetics M&E program
Is the program understood and followed by staff?			✔		No program is in place	Develop a genetics M&E program

Section 4

Remedial Actions

Based on the compliance status for each performance measure, remedial actions were developed. The required remedial actions are organized into five categories. The types of categories range across a spectrum from those actions that are beyond human control, to those that require a change in agency policy or procedures, to those that involve a significant capital cost to put in place. The following are the five types of remedial actions identified under phase 1 of the audit:

The Five Types of Remedial Actions

Type	Description
1	Non-compliance issues resulting from items beyond human control or Performance Measures not relevant for this hatchery
2	Remedial actions requiring changes in agency policies or procedures
3	Remedial actions requiring changes in monitoring coverage or interval
4	Remedial actions requiring significant capital expenditures
5	Remedial actions that may require significant capital expenditures but are not clearly definable at this time

Remedial Actions at Umatilla Hatchery - URB Fall Chinook

This section presents the corrective actions required to bring the Umatilla Hatchery - URB Fall Chinook program into compliance with the IHOT performance measures. The remedial actions suggested here are just that, suggestions developed by the Montgomery Watson Audit Team. For some non-compliance areas, other remedial actions could be proposed. The required remedial actions are cross-referenced to each IHOT performance measure that was not in compliance. Where appropriate, the costs associated with the remedial actions are also presented (Table 3).

The cost estimates presented in this section are based on professional experience from similar projects. In most cases, only a lump-sum figure is presented and detailed take-off lists have not been prepared. The cost estimates are essentially order of magnitude estimates (± 40%).

More importantly, the suggested remedial activities may also present several levels of action. Optional actions have been listed for several problems. These optional actions are desirable for either operational or safety considerations.

Table 3. Remedial Actions Required at Umatilla Hatchery - URB Fall Chinook

Remedial Action Required	Cost	PMs[1]
Type 1 - Non-compliance issues resulting from items beyond human control or Performance Measures not relevant for this hatchery		
Improve green-egg to eyed-egg survival; smolt to fry survival, and number at release over time by continued increase in the use of Umatilla River broodstock as the run size increases	----	4d, 4f, 22a4
Type 2 - Remedial actions requiring changes in agency policies or procedures		
Document adult contribution	----	4a
Document adult pre-spawning survival over time	----	4b
Modify temperature of hatchery water supply (not a problem because the hatchery meets program requirements)	----	5a, 21, 29
Begin routine testing of alarms using IHOT recommendations	----	6
No telephone pagers in use (not a problem because onsite residences are hard wired to alarms)	----	6
Interior of insulated feed hoppers exceeds 80 °F on very hot days	----	12
Develop specific incubation standards and written incubation practices for the IHOT Operations Plan	----	18
Develop written flow and loading criteria for incubation in IHOT Operations Plan	----	18
Develop smoltification goal and monitoring plan	----	22a1, 36
Follow IHOT disinfection policies for transportation	----	23
Develop written spawning protocols in IHOT Operations Plan	----	42
Develop a genetics monitoring and evaluation program in IHOT Operations Plan	----	43

[1] PMs are performance measures that were extracted from the IHOT 1995 report. The IHOT performance measures are listed in Table 2 in Section 3 in numerical order.

Remedial Action Required	Cost	PMs[1]
Type 3 - Remedial actions requiring changes in monitoring coverage or interval		
Run analysis for chemistry parameters	----	5c, 21, 29
Run analysis for nitrite	----	5f, 21, 29
Run analysis for contaminants	----	5g, 21, 29
Conduct IHOT feed QA/QC testing	----	12
Type 4 - Remedial actions requiring significant capital expenditures		
Provide a second set of screens for all raceways (24 Michigan ponds and 12 Oregon ponds)	$18,000	10
Type 5 - Remedial actions that may require significant capital expenditures but are not clearly definable at this time		
None identified	----	

[1] PMs are performance measures that were extracted from the IHOT 1995 report. The IHOT performance measures are listed in Table 2 in Section 3 in numerical order.

Section 5

Hatchery Contribution to Fisheries, Spawning Grounds, and Hatcheries

This section presents the audit findings for the Umatilla Hatchery - URB Fall Chinook program contribution of adult fish to fisheries, local fisheries, spawning grounds, and hatcheries. Data is reported by broodyear. A broodyear refers to the adult contribution from the eggs produced from a single group of spawning adults. For some species, this may include fish caught as 2-, 3-, 4-, 5-, and 6-year old fish. Because of the return distribution and data processing delays, the complete adult contribution for a given broodyear may not be available until 4 to 5 years after the fish have been released from the hatchery.

Table 4. Adult Contribution to Fisheries, Spawning Grounds, and Hatcheries: Umatilla Hatchery - URB Fall Chinook

Year	Fisheries[1] (Broodyear)	Spawning Grounds[1] (Broodyear)	Hatchery[1] (Broodyear)	Total Combined Contribution[2] (Broodyear)	Smolt to Adult Survival (percent)
1981					
1982					
1983					
1984					
1985					
1986					
1987					
1988					
1989					
1990					
1991	**Complete data not available**	**Complete data not available**	**Complete data not available**	**Complete data not available**	**Complete data not available**
1992	**No data yet available**	**No data yet available**	**No data yet available**	**No data yet available**	**No data yet available**

[1] Data obtained from Missing Production Groups Annual Report or from the Regional Mark Information System database.

[2] Total combined adult contribution; presented when it is not possible to subdivide the contribution into fisheries, spawning grounds, and hatchery contributions.

Section 6

Annual Operating Expenditures

The level and detail of annual operating expenditures varies widely depending on hatchery, operating agency, and funding source. When provided, expenditures were presented in terms of personnel costs, operating costs (power, feed, supplies), capital costs, indirect costs charged to the federal government, third-party costs, and other costs. These cost components were summed to determine a total hatchery annual cost. Based on discussion with the hatchery manager, the percent of total hatchery costs allocated to a given program was estimated. The total hatchery costs and the percent of hatchery costs allocated to a given program were used to compute the cost of a given program. Table 5 shows the annual operating expenses for the overall Umatilla Hatchery URB Fall Chinook program. For programs that occur at more than one facility (as shown on Table 1 in Section 3), the cost breakdown for the component(s) at each facility is presented in separate tables (Tables 5a and 5b).

Table 5. Annual Operating Expenses - Umatilla Hatchery - URB Fall Chinook

Facility	1994	1995	1996
1. Umatilla Hatchery	$234,010	$333,986	$421,281
2. Umatilla Satellites (Three Mile Dam, Imeques C mem-ini-kem, and Thornhollow)	$0	$80,583	$160,932
3.			
4.			
5.			
Total Program Costs	**$234,010**	**$414,569**	**$582,213**

The total expenditures for the Umatilla Hatchery are presented in Table 6 by program. The detailed breakdown of program expenditures at this hatchery is presented in separate tables (Tables 6a, 6b, 6c, and 6d).

Table 6. Annual Operating Expenses for All Programs - Umatilla Hatchery

Program	1994	1995	1996
1. Summer Steelhead	$150,898	$208,110	$191,650
2. Spring Chinook	$516,517	$300,453	$260,190
3. Fall Chinook	$234,010	$333,986	$421,281
4. Winter Steelhead	$0	$0	$0
5.			
Total Hatchery Costs	**$901,425**	**$842,549**	**$873,121**

Table 5a. Annual Operating Expenses: Umatilla Hatchery URB Fall Chinook

Expenditure Occurring at Umatilla Hatchery

Component	1994	1995	1996
Personnel Costs	$342,901	$344,365	$333,483
Operational Costs	$427,692	$371,874	$421,818
Capital Costs	$300	$0	$0
Indirect Costs	$130,532	$126,310	$117,820
Lumped Hatchery Costs[1]			
Lumped Third-Party Costs	$0	$0	$0
Total Hatchery Costs	**$901,425**	**$824,549**	**$873,121**
Source of Funds			
100% BPA			
Program Production (lb)	43,809	45,2062	63,719
Total Production (lb)	168,762	114,048	132,067
Program as Percent of Total	25.96	39.64	48.25
Program Costs	**$234,010**	**$333,986**	**$421,281**

[1] When it was not possible to obtain a detailed cost breakdown from an agency or Third-Party, the undivided costs were entered here.

Table 5b. Annual Operating Expenses: Umatilla Hatchery URB Fall Chinook

Expenditure Occurring at Umatilla Satellites

Component	1994	1995	1996
Personnel Costs			
Operational Costs			
Capital Costs			
Indirect Costs			
Lumped Hatchery Costs[1]	$169,421	$198,917	$246,656
Lumped Third-Party Costs			
Total Hatchery Costs	$169,421	$198,917	$246,656
Source of Funds			
BPA	**100%**	**100%**	**100%**
Program Production (lb)	0	67,252	133,169
Total Production (lb)	101,319	166,009	204,104
Program as Percent of Total	0%	40.51%	65.25%
Program Costs	**$0**	**$80,583**	**$160,932**

[1] When it was not possible to obtain a detailed cost breakdown from an agency or Third-Party, the undivided costs were entered here.

Table 6a. Detailed Expenditures at Umatilla Hatchery by Program

Summer Steelhead

Component	1994	1995	1996
Personnel Costs	$342,901	$344,365	$333,483
Operational Costs	$427,692	$371,874	$421,818
Capital Costs	$300	$0	$0
Indirect Costs	$130,532	$126,310	$117,820
Lumped Hatchery Costs[1]			
Lumped Third-Party Costs	$0	$0	$0
Total Hatchery Costs	**$901,425**	**$824,549**	**$873,121**
Source of Funds			
100% BPA			
Program Production (lb)	28,253	28,166	28,990
Total Production (lb)	168,762	114,048	132,067
Program as Percent of Total	16.74	24.7	21.95
Program Costs	**$150,898**	**$208,110**	**$191,650**

[1] When it was not possible to obtain a detailed cost breakdown from an agency or Third-Party, the undivided costs were entered here.

Table 6b. Detailed Expenditures at Umatilla Hatchery by Program

Spring Chinook

Component	1994	1995	1996
Personnel Costs	$342,901	$344,365	$333,483
Operational Costs	$427,692	$371,874	$421,818
Capital Costs	$300	$0	$0
Indirect Costs	$130,532	$126,310	$117,820
Lumped Hatchery Costs[1]			
Lumped Third-Party Costs	$0	$0	$0
Total Hatchery Costs	**$901,425**	**$824,549**	**$873,121**
Source of Funds			
100% BPA			
Program Production (lb)	96,700	40,676	39,358
Total Production (lb)	168,762	114,048	132,067
Program as Percent of Total	57.3	35.66	29.8
Program Costs	**$516,517**	**$300,453**	**$260,190**

[1] When it was not possible to obtain a detailed cost breakdown from an agency or Third-Party, the undivided costs were entered here.

Table 6c. Detailed Expenditures at Umatilla Hatchery by Program

Fall Chinook

Component	1994	1995	1996
Personnel Costs	$342,901	$344,365	$333,483
Operational Costs	$427,692	$371,874	$421,818
Capital Costs	$300	$0	$0
Indirect Costs	$130,532	$126,310	$117,820
Lumped Hatchery Costs[1]			
Lumped Third-Party Costs	$0	$0	$0
Total Hatchery Costs	**$901,425**	**$824,549**	**$873,121**
Source of Funds			
100% BPA			
Program Production (lb)	43,809	45,206	63,719
Total Production (lb)	168,762	114,048	132,067
Program as Percent of Total	25.96	39.64	48.25
Program Costs	**$234,010**	**$333,986**	**$421,281**

[1] When it was not possible to obtain a detailed cost breakdown from an agency or Third-Party, the undivided costs were entered here.

Table 6d. Detailed Expenditures at Umatilla Hatchery by Program

Winter Steelhead

Component	1994	1995	1996
Personnel Costs	$342,901	$344,365	$333,483
Operational Costs	$427,692	$371,874	$421,818
Capital Costs	$300	$0	$0
Indirect Costs	$130,532	$126,310	$117,820
Lumped Hatchery Costs[1]			
Lumped Third-Party Costs	$0	$0	$0
Total Hatchery Costs	**$901,425**	**$824,549**	**$873,121**
Source of Funds			
100% BPA			
Program Production (lb)	203	390	304
Total Production (lb)	168,762	114,048	132,067
Program as Percent of Total	< 0.2%	< 0.4%	< 0.3%
Program Costs	**$0**	**$0**	**$0**

[1] When it was not possible to obtain a detailed cost breakdown from an agency or third party, the undivided costs were entered here.